



**Electronics and Communication Engineering Department**  
**Delhi Technological University**  
**Delhi-110042**  
**www.dce.edu**

## **CERTIFICATE**

This is to certify that the dissertation titled “**Comparative Study of Analog Filters Using Analog Building Block**” is a bonafide record of work done by **Gurdeep Singh, Roll No. 2K12/VLS/07** at **Delhi Technological University** for partial fulfilment of the requirements for the degree of Master of Technology in VLSI and Embedded System Design. This project was carried out under my supervision and has not been submitted elsewhere, either in part or full, for the award of any other degree or diploma to the best of my knowledge and belief.

Date: \_\_\_\_\_

**(Mr. Alok Kumar Singh)**

**Assistant Professor**

**Department of Electronics and Communication Engineering**

**Delhi Technological University**

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**Gurdeep Singh**  
**University Roll no: 2K12/VLS/07**  
**M.Tech (VLSI and Embedded System Design)**  
**Department of Electronics & Communication Engineering**  
**Delhi Technological University**  
**Delhi – 110042**

## **ABSTRACT**

In recent years, the current conveyor is receiving considerable attention as they offer analog designers some significant advantages over the conventional op-amp. The current conveyor is a good choice for low voltage applications. It provides some notable features like high gain-bandwidth product, flexibility of driving current or voltage signal output at its two terminals, relatively high slew rate, reduced supply voltage. Also, it requires less number of passive components to perform a specific function. Hence, it is suitable for both current and voltage mode devices. Current mode design technique offers voltage independence, high bandwidth in analog circuits with properties of accuracy and versatility in a wide range of applications. Here, I present a study on current conveyors, especially second generation current conveyor (CCII). Various applications of current conveyors are highlighted in literature survey such as integrator, differentiator, amplifier, filters, oscillator etc. Then detailed study of various current conveyor (CCII) topologies such as translinear loop based current conveyor, Differential Amplifier Based current conveyor, Wide band current conveyor, flipped current conveyor is done. Different properties of topologies such as voltage and current bandwidth, port resistances, voltage and current gains, transient behavior, offset voltage value, offset current value etc. are also studied comparatively. AC and DC port analysis is also done for these topologies in order to study their behaviour with frequency. By analysis parasitic impedance values for each topology are also calculated. This study of different second generation current conveyor topologies helps in further designing of current conveyor based applications such as filters. So, low pass filters are designed using above mentioned four topologies of CCII and various properties of these filters are studied for each of the topology.

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## **ABBREVIATIONS**

CC	Current Conveyor
CCI	First Generation Current Conveyor
CCII	Second Generation Current Conveyor
CCII+	Second Generation Current Conveyor positive output
DOCCII	Dual output current conveyor
FVF	Flipped voltage follower
LPF	Low pass filter
HPF	High pass filter
BPF	Band pass filter
LVLP	Low voltage Low power